AGRICULTURAL DEPARTMENT.

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PUBLISHER'S NOTICE—All communications intended for this department should be addressed to Prof. J. P. Stelle, Fort Worth, Tex.

ARTESIAN WELL IRRIGATION.

In his recent progress report on irrigation in the United States Mr. Richard J. Hinton states, page 108, that the developments now in progress give assurance to the expectation that artesian wells and their supplies will become a widespread and most important factor in irrigation by their use in the cultivation of small fruits, orchards, vineyards, truck farms and so on, under conditions which will bring large returns for outlay, insuring the fullest success. These wells, save in exceptional cases, may not yield outflow sufficient for irrigating extensive farms devoted to the usual farm crops, though in some of the artesian areas a number of wells throwing their water into extensive reservoirs might fill every requirement in this direction. In Utah, for instance, grass and alfalfa is to some extent irrigated by the old way of flooding the entire surface, and artesian wells are supplying the water.

But the utilization of artesian waters must, as a general rule, be directed towards special crops and intensive culture on small farms. No objection to this can be urged, however, for there is more money to be made by culture of such character than by that of any other. It is the small farmer operating on the intensive plan who makes farming pay the largest returns for outlay. While large farms are of great advantage to a region of country, it is the small and intensively managed farms that make a region flourish like the green bay tree. They give employment directly to the greatest number of people, and indirectly they give employment to fully as many more by bringing factories and various industries to work up their products.

How to apply water to these small farms from artesian wells needs no description. The water may be run into a comparatively small reservoir on some elevated point in the field, and thence let out through suitable ditches to flow between the beds or rows as needed, or it may, where the outflow is considerable, be run direct from the well. A reservoir would probably be best, however, where the farmer could afford one, as an exposure of the water to the atmosphere for a time would, many think, have a tendency to temper it, and to naturalize it, so to speak—all its gaseous nature, if it has any, would escape during exposure in the reservoir. A water highly mineralized would be apt to change considerably from that peculiarity on exposure for a few days at the surface.

It may be well to remark here that a somewhat general impression prevails to the effect that the waters of, say our Fort Worth-Waco artesian area for instance, are not good for plants. Persons throwing them directly upon plants have found the plants suffering somewhat from the effect. This may come of the considerable amount of alkaline matter carried in solution by the waters. But when these waters are employed in regular ditch irrigation no bad effect whatever results. As the water soaks through the soil to the roots of the plants this mineral matter is filtered out, and really it is of advantage to the soil, as the mineral matter filtered out undergoes a chemical change and becomes an element of plant food, tending to assist materially in keeping up fertility.

Treating of irrigating on a somewhat large scale from artesian wells, as now practiced in many localities, Mr. Hinton says a circular reservoir is built around the well, or near it, where the waters of the well may be turned directly into the reservoir. It is usually made of brick, stone or concrete, and cemented water tight on the inside. Must occupy a site sufficiently elevated to admit of an easy flow of water to and over the fields. The size of the reservoir is governed by the flow of the well or wells, as to volume, and the acreage to be irrigated. To irrigate 100 acres depending wholly upon artificial water supply requires a reservoir 300 feet in diameter and about three feet deep. From this reservoir main ditches are cut leading along the higher lands of the farm, but having a fall so gentle as to pass the water along at a very slow rate of movement. Some engineering is necessary in the location of the main ditches, for in case the field is not entirely level, or nearly so, the ditches must wind about on the slopes in such a way as enables them to maintain very nearly a level from end to end. Of course there is fall enough from the reservoir to make the waters flow slowly onward along the ditch.

It is best to throw up a low bank or levee on either side of the ditch to prevent surface waters from running into it during rains and filling it with sediment. The well waters carry no sediment, of course, and since their flow is kept too gentle to cause washing, a ditch so made will last an almost indefinite time without repairs.

These main ditches are from three to four feet wide, depending upon the acreage under irrigation, and from ten to twelve inches deep. From them small laterals lead out all along to carry water between rows or beds in the field. There is no need of having the main ditches deeper than the laterals, as in that case a quantity of water would remain in the main ditches and be lost. They must be shallow enough to discharge all their water into the laterals.

At the junction of each main ditch with the reservoir a gate is set and so arranged as to completely regulate the outflow of water. Having everything thus arranged, all needed, when it becomes necessary to irrigate, is to open the gates and let the water into the ditches. From these it flows out slowly, taking off at each lateral until the entire field is watered. Evening is the best time to turn on the water, as there is less loss by evaporation in the night than there is in the day time. Once a week is considered often enough to irrigate in periods of drouth when there is no rainfall. The ditches and laterals are so arranged as to hold water about equal to one inch of rainfall over the entire surface. If there has been rain in the course of the week, but not so much as one inch, as shown by the rain-gauge, enough water is let on at the end of the week to make up the deficiency. After a little experience a scaled water mark in the reservoir compared to the showing of the rain-gauge tells exactly how much water to let on.

It is not probable that all irrigators are so exact in their operations as suggested. Experience soon enables them to tell at a glance when the crop needs water and how much it needs. And then these figures are intended for general application, and will need to be somewhat varied to suit the demands of different soils on account of their variations in the imbibation of water. Some soils will require more and some less water than others. Experience and observation will soon enable the irrigator to settle all these points. As a most common rule the irrigator simply watches his crops and when he sees they are in need of moisture, he opens the gates and turns on the water, and everything pans out all right.

Further along on this page will be found an article descriptive of irrigation in Utah, which will give much additional information with reference to irrigation from artesian wells.

CHINCH BUGS ON A RAID.

Last week Mr. J. N. Withers of Virgile, Johnson county, brought us a bottle of chinch bugs as delegates from huge hosts of that tribe that were cutting some very fantastic antics on his place. The bugs had suddenly appeared upon a piece of ground where he had turnips last spring, but which was now grown up in weeds. Like a great army they were all moving the same direction and in compact form, completely covering a space some two or three feet in width and many feet in length. They appeared to be passing along over the ground on "double-quick," and what surprised Mr. Withers most was the fact that there were no stragglers to speak of away from the regular line of march. Whose "march to the sea" it was Mr. Withers could not tell, but they were going, no doubt about that, and so great was their hurry that not one of them seemed to evince the slightest disposition to stop for refreshments. Not far away on their course was a field of cotton, but Mr. Withers couldn't feel much uneasiness over what they might do there. A field of corn was on the same line, but he rather laughed in his sleeve at the thought of the sad disappointment that would pervade the entire ranks of that army when the corn was reached and couriers were sent back along the lines announcing that the season of growth had been too long on with said particular cornfield to leave it of special use to chinch bugs.

Mr. Withers had never before seen a chinch bug on his place or in his neighborhood, hence how they came there so suddenly and in such great numbers was a problem having a solution entirely beyond his ability to solve. What they might do for him this season was not a matter calculated to rouse much concern on his part, but he couldn't help feeling interested in what might come of it next year. On this account he said an article from us through THE GAZETTE giving the natural history of the chinch bug would be very acceptable to him and others, and we promised to attend to the matter, which we now proceed to do.

The best authorities tell us that the chinch bug (Micropus lencopterus) is two-brooded in the season, at the North, and probably three-brooded at the South. Mr. Riley thinks it may be four-brooded down here. It is a great feeder and eats incessantly from the time when it is hatched from the egg on until it dies of old age. The earliest brood of the season runs its course and deposits eggs in the ground for the second brood. These eggs hatch a far more numerous brood than the first, to be followed in the South by a third and still more numerous brood, and possibly, if Mr. Riley be correct, by a fourth brood, though this last brood might not be so numerous as the third on account of deficiency in natural food so late in the season. But enough of food is always found late in fall to make out on and carry a fair sprinkling of bugs to the season of winter. Through this season they remain in the torpid state to awake into activity with the first warm weather of spring, and at once make preparations for the chinch bug industry of the next year.

This is about all there is in the way of chinch bug natural history. You cannot tell one year where it is to appear next year in destructive numbers. Of course one would naturally suppose that a locality having it in great numbers this year would stand a fair chance of being scourged by it next year, and yet there is so many things working against it as to render such calculations not entirely certain. One of the strongest things against its reappearance the next year is a very wet fall. Rain cuts it off more effectually than anything else. So far as yet known there is no remedy with which we can successfully combat it.

THE CHUFA AND ITS CULTURE.

Mr. Thomas P. Jackson of Mineola, Tex., has asked us for an article on this subject—here it is.

The chufa goes by the common name of grass nut (not nut grass) in some localities, and earth almond in others. Its botanical name is Cyperus esculentus. Belongs to the sedge family, and is as much a sedge as is the notorious nut grass—Cyperus hydra, to which it is closely related. On its roots are borne large numbers of rough, brownish tubers, each about the size of an ordinary case-knife bean. These tubers are edible, and have a flavor not unlike that of the cocoanut. They are furthermore regarded as a fine food for hogs and poultry. Few plants could be more prolific—a single tuber planted in good ground will often yield a quart at the harvest.

Chufas will grow on almost any kind of soil, though the plant mostly delights in a rich loam slightly sandy. Our river and creek bottom lands of Texas, when well drained, would suit it to perfection. By well drained we mean a land not wet, soggy and sour. If the land should be slightly damp, all the better, provided it is friable.

For a good crop prepare the land deeply, pulverizing it well. Lay off in rows three feet apart, and plant the tubers eighteen inches apart in the rows. Cover to the depth of two inches. Leave the land level—not ridged. Early spring, so soon as danger of frost has passed, is the best time to plant. If the seed tubers have been kept dry through the winter, soak them in water for two days previous to planting.

You will find the plants slow to appear, but don't be discouraged—very few will fail to come, but they must have their own time about it. A peck of tubers will be amply sufficient to plant an acre, and an acre well put in will yield 100 bushels of chufas.

The usual method of culture is to run through the first time with sweeps, and if this leaves any weeds or grass remove them with the hoe. Let stand about three weeks, then run through again. Follow this by hoeing out such weeds and grass as may have been left, and your work of culture is finished.

The crop will be ready for harvest in the fall. It is but seldom harvested, however, as that would be an almost endless job. The most common plan of procedure is to dig enough chufas for next year's planting and then turn in the hogs to gather the remainder.

An erroneous impression prevailing among the people to the effect that the chufa once started upon one's farm would become a pest has tended largely to holding back its culture. The impression probably sprung from its near resemblance to nut grass while growing. But there are no pest qualities about the chufa. A few plants might appear next year on the grounds where you raised chufas this year, but they would yield to culture as readily as wheat, oats or clover, evincing no kind of disposition to spread and take possession of the land.

IRRIGATION IN UTAH.

We have before us census bulletin No. 85 which treats of irrigation in Utah the region from which comes most of the Irish potatoes used in North Texas, at least, during the fall season, and which might just as well be raised at home under the same system as employed there. Much of the irrigation enabling trucksters in Utah to produce these fall crops for which we pay so highly, is from artesian wells, yet the artesian advantages there are very far below those of the artesian areas in most parts of Texas. The bulletin says, page 9, that the diameter of the wells ranges from one and a quarter to four inches, though there are a few—very few—six-inch wells. The average amount of water discharged from these wells is about twenty-six gallons per minute. About all the wells are used for domestic supply, as watering stock and the like, but they give some 48 per cent, on an average, more than is needed for this purpose. Not a gallon of this surplus is allowed to go to waste, however, as is usually done by artesian well owners in Texas. It is employed in the irrigation of crops, and on an average irrigates near five acres of land to the well.

In treating on how the water is applied this bulletin says Irish potatoes, corn, vegetables and plants growing in beds are irrigated by furrows through the patch or field. Along these furrows or small ditches a little stream of water is allowed to flow from the well, gradually moistening the ground on either side. In some cases grain patches are also irrigated by this small supply of water, but not often by flooding the field as is usually thought to be necessary. Small furrows are made across the small grain field through which water flows and acts the same as in the truck farming. The furrows are made by means of some simple contrivance gotten up by the farmer himself. A heavy roller to pass over the grain after sowing, and having on it annular projections two or three feet apart to leave depressions in the soil is a very popular arrangement. Care must be exercised to so run the roller, depending upon the lay of the land, that water will flow along the depressions left from end to end. The depressions may be so sharp and narrow as to take up no space from an occupancy of the grain that would be worth naming. Into these little markings or depressions water is turned from the well whenever needed and the effect for good on the grain is something marvelous.

This kind of trench irrigation for small grain is found to be far better than surface flooding, as it takes less water, is less favorable to evaporation and does not pack or crust the surface.

Now, there is in Texas to-day millions running to waste from artesian wells bored simply for domestic purposes. No one seems to think of saving the surplus water, it is allowed to run off from the well in a considerable branch and eventually lose itself in the uncultivated grounds along its course. We know of numerous such cases immediately about Fort Worth, and you will find the like of it almost everywhere in our artesian areas.

It has been estimated that we already have fully 3000 good artesian wells in the state of Texas, with more going down constantly. The average outflow of those wells is much above that of the wells in Utah. Now, suppose the surplus water of those wells was carefully turned to account for an irrigation of crops, as is done in Utah, averaging five acres to the well. It would give us 15,000 acres of land that could be depended upon for a never-failing succession of heavy crops the year round, especially in the way of truck production. It might be safely said that we would get three sure and heavy crops where we are getting but one now, and that one not entirely sure.

It will not call for much figuring to show the important part 15,000 acres, say to a fall crop of Irish potatoes raised at home, would cut in supplying the needs of Texas in that line. While it might not supply our entire demands, it would certainly go a long way towards it, and its profits would be about the same as that much money picked up in the road by our people.

To argue that Texas could not raise summer and fall crops under irrigation as well as they can be raised in Utah, would be simply spouting nonsense. Our soils are better than those of Utah, and every other natural condition is more favorable for crops here than there. The only shortage with us is water, and that, as has already been shown, we are throwing away on a most gigantic scale without being able to offer any kind of a good excuse for it. Texas must get out of that kind of thing if she would keep pace with other moving regions. Economy is wealth, you know. To deliberately throw away each year a means that would enable us to produce two good and profitable crops more than we are now producing, is undoubtedly bad economy, to say the least of it.

IRRIGATION IN LOUISIANA.

It is well understood that Louisiana irrigates her rice, but to talk of irrigation for other and general crops in that state would seem like a strange way of talking; and yet Mr. J. Y. Gilmore read, on the 11th of June last, a paper before the Audubon agricultural association of New Orleans in which he took the position that general irrigation must come. Without irrigation no state could keep pace with the states irrigating. It was now known that an artificial application of water to crops paid anywhere. The late A. N. Cole of Wellsville, N. Y., experimented with irrigation, and proved conclusively that it paid handsomely there. A very interesting book was written by him on the subject. He established a series of reservoirs on hillsides, from which he drew water for his crops, the application of which enabled him to entirely overcome the effects of drouth at any and all seasons. On his irrigated lands he grew vegetables and strawberries to a degree of success and perfection that astonished everybody who saw them.

Few people have been thinking of irrigating for general crops in Louisiana, continued Mr. Gilmore. There is in the state a rainfall more than double the average of the rainfall in other states, yet the rain does not always come in the season when greatly needed. There are periods of most severe drouth, which are liable to seriously shorten crops. An agricultural people cannot in these days of close competition afford to have crops cut short, therefore, irrigation must and will become common even in Louisiana.

Along all the water courses in alluvial Louisiana the lands are comparatively level, with a gradual slope from the streams. Hence, with a vast and inexhaustible water supply to draw from, and but little labor requisite to conduct it wherever needed, the time is undoubtedly not far in the future that shall see every crop aided by an artificial water supply. Science has shown that by liquid absorption alone can plants take their nourishment. It is no exaggeration, he asserts, that when planters have perfect control (as they may) of crop moisture so as to give all water needed where nature would put the crop off with a deficiency, the productiveness of Louisiana will more than double annually what it is to-day. There will be no shortage in any season—none can be expected. Farming will then be as certain as manufacturing, and then farming will pay.

Besides, he continues, a greater diversity of crops can be grown, for it has been proved that when conditions of the soil can be controlled the farmer can raise anything he desires to raise that is adapted to his climate. As a result he will be able to take his own choice out of the most profitable crops in demand.

Mr. Gilmore says he is not advancing mere theory. Already there is irrigation in Louisiana paying handsomely. Mr. James D. Houston, on his Ben Hur plantation in the parish of East Baton Rouge, has this season irrigated his cane most successfully by the open-ditch system. He has heard it urged that the water may be too cold for so warm a climate. Those who make this suggestion are either unaware or unmindful that in Colorado, New Mexico and elsewhere in the West, where all crops are made by irrigation, the waters are almost of icy coldness, being from the melting snows of the mountains, and so cold that no fish except the mountain trout can live therein. Then, too, when it is remembered that these expensive canals are constructed to carry water long distances, it should make us more highly appreciative of nature's kindness here and determine us at an early day to bring our land to the highest state of culture by a proper system of irrigation.

There is something in the foregoing entirely worthy of Texas ponderation. If rainy Louisiana is in need of irrigation to make her crops sure and what they ought to be, how about Texas? Is the great state of Texas going to lie low and allow all her near neighbors to get the bulge on her? She don't carry the name of often doing that kind of thing, yet getting her people much interested in irrigation (one of the strongest levers of success), seems a fearfully hard work to accomplish, somehow or other.

OUR CORRESPONDENTS.

This department is devoted to answering such questions as may be asked by our subscribers, which may be of general information. Inquiries of personal character that require answer by mail should always have stamp inclosed. Please give full name and postoffice address in addition to any such signature as "Subscriber," or "A. G. D," not for publication, if against the will of the writer, but to admit of direct communication should such a thing be deemed necessary. Address as directed at head of this page.

ON WATERING TREES.

I must admit that there is much of sound reason in what you said last week with reference to watering street and yard trees. Of course it would be impossible to do the tree any good by watering unless you could put the water where the feeder-roots could get at it. I know of many trees in Fort Worth now suffering seriously from drouth, although their owners have watered them freely every evening; therefore their owners cannot for the life of them understand what's the matter. They have been applying the water to a small dug-up space immediately around the base of the trees. I hope your article of last week will set them right in the matter. There is but one trouble that I can see connected with your plan of applying the water in a circle of several feet out from the base of the tree. You say the ground must be dug up in that circle of three or four feet in width. Many lawn or yard trees are in grass plats that their owners would much regret to so disfigure. True the sward could be left unbroken immediately around the base, as you suggest, but the large circle further out would seriously cut up the grass in case of a small plat. TRINITY.

Tarrant county, Tex.

There is no need of removing the grass if you don't want to remove it. We suggested digging the ground to hold the water where needed. If thrown around the tree on the hard, level and unbroken surface most of the water would run off or be evaporated—very little would get down to the roots. But the surface may be broken sufficiently to take in the water without removing any grass. Use a spading fork, thrusting it down through the sod and prying up slightly without tearing the sod out. This may be done in such a way that the grass would scarcely show that anything at all had been done, yet it would let in the water effectually.

A good way to arrange for watering yard or lawn trees on level ground is to scoop out the surface in a circle around eight or ten feet from the base and about four feet wide, making a slight depression. The depression may be so slight as scarcely to attract attention—two inches of sink would be ample, and even less might answer every purpose. Cover the depression with grass by seeding or sodding. Into this depression run your water and leave it to soak down to the feeder-roots of the tree. With such an arrangement there will be no particular need of breaking the surface to facilitate watering, as the water, being confined to the circle, cannot do otherwise than soak down. Water should be applied late of an evening to lessen the loss from evaporation.

No matter how dry and hot the weather, the correct application of water out several feet from the base of the tree will carry it through in first-class condition. As stated by us last week, water thrown immediately around the base of the tree is simply water wasted and labor in vain.

A TROUBLESOME INSECT.

At the request of Dr. Grammer I send you three specimens of worms inclosed in their cocoons, which he found on a small arbor vitæ tree in his garden. They were apparently dead. There was about a quart on a small shrub not over three feet high, and so closely were they resembling the tree both as to color and in being covered with bits of the foliage that it was no easy matter to see them. When they had been picked from the tree and cast upon the ground an apparently lifeless cocoon, lo a door came open at one end, the head of a worm protruded, and the whole thing began to walk off—worm, worm's house and all.

These strange insects attached themselves to the first green shrub they came to and seemed to consider themselves entirely at home, clinging to the branches with their front feet, and allowing the cocoon, or house, or whatever you may call it, to hang down. The cocoon, if that name will do, is, as you will see, a little over one inch in length, and as it hangs on the tree, has something the shape of an inverted cone.

Please explain what manner of insect this is, and how a person may get rid of it. Already it has destroyed several trees and shrubs in this neighborhood.

JOHN ADAMSEN.

Fort Worth, Tex.

It is the basket worm, alias "bag worm," alias "drop worm" and alias "hang worm." Its scientific name is Thyridopteryx ephemeræformis. Several articles with reference to it have already appeared in this department of THE GAZETTE—a somewhat exhaustive article giving its natural history was published by us last spring, probably in April or May.

Spraying the trees with some kind of arsenical insecticide, as Paris green or London purple, is the best remedy for early spring, say April, for Texas. If all the worms are not destroyed by this operation it might be repeated about the last of May. Much may be accomplished towards reducing the next year's visitation by picking off the insects by hand in fall or winter and burning them. They seem to prefer the narrow-leaf evergreens, as cedar and arbor-vitæs, though they can make out very well on any kind of tree. In spring when they are not larger than grains of wheat, they are often very destructive to roses, especially where cedar or arbor-vitæ trees are on the same grounds.

LIME IN CISTERN WATER.

As I have been a subscriber to THE GAZETTE for many years, I feel inclined to claim the right of asking you a question or so. Therefore, what will take the lime taste out of my cistern water? It is so strong of lime that we can scarcely use it. I dug my cistern and walled it with brick, laying the brick in strong lime mortar, but it is not cemented. It stood full of water through last year. Last winter I caught it full of water (200 barrels), and it now contains seventy-five barrels. A few days ago the water suddenly became limey as mentioned. P. J. WEBB.

Peoria, Tex.

The trouble with your cistern is evidently due to water's getting in from some lime-charged stream at the outside. Such happenings are very common in Texas. There may not be a permanent stream outside but it is water carrying lime, and hence it damages your cistern water all the same. We have on the place occupied by us a fine cistern affected in the same way. It is a cemented cistern and yet the outside water has somehow managed to get through.

Once lime-water has found its way in there is no way of removing the lime from that particular water. Your only remedy would lie in drawing out the water in fall, before the rains have set in, and while the shallow underground streams are at their lowest, and treating your cistern to a heavy lining of Portland cement. Even then some lime water would be apt to work its way through the cement, as it does in our cistern. If you are very particular to have your water entirely clear of lime let the cement dry as much it will, and then go over it with a heavy coating of raw linseed oil put on boiling hot, so that it will penetrate the wall. This is often done to keep the rain water pure, and put on as directed, the linseed oil will last many years. For a month or so after turning water into the freshly oiled cistern you may be able to detect a slight taste of the oil but this will soon pass away.

It is a very difficult matter to keep water soft in a cistern that, through the wet season at least, is surrounded by water outside, carrying lime in solution. A wall entirely impervious is the only thing that will do it. So long as the cistern is entirely full there will be no trouble, but when the water in the cistern gets below that outside the outside pressure will be apt to force water through by some means or other. Enough would almost invariably percolate through a cemented wall to make the water more or less hard.

HOW A MOSQUITO BITES.

We were all much amused over what you said in THE GAZETTE about raising mosquitos, but now there is one thing with reference to the mosquito that I would like to have you explain: How does the mosquito manage to bite us so fearfully? I am a school-boy studying such things, and it is a puzzle to me that so light a creature as a mosquito should be able to sit on one's hand without holding and press a piercer down through the thick skin. If the mosquito weighed a pound or so I might understand it, but since he weighs next to nothing I cannot see how he manages the force that must be necessary to make such a puncture.

Waco, Tex. GEORGE.

The mosquito does not bite at all, sonny, though that is what we charge him with doing. How could he bite when he has no teeth? But he gets there all the same, don't he? and since you have put your question to us we don't mind telling you all about how he does it.

According to the tell of the microscope the mosquito carries inside his bill or proboscis a pair of minute but extremely sharp scissors, so to speak. If they really are scissors they are the neatest and keenest little cutting tools in that line that you ever saw. He takes his scissors along with him wherever he goes, and when he feels a desire to regale the inner man he sings around us for a time clipping his scissors together, possibly, a la barber, and finally settles down on some exposed part of our person. If we permit him to do this in peace he picks out a place with good artesian indications, and elevating his hands (perhaps they are his hands), sits quietly a moment as if asking a blessing. It may be that he is waiting to make sure that there are to be no dangerous after-claps; or possibly he is going through with some kind of incantation intended to determine as to whether or not we belong to one of the friendly tribes. Having finished this part of the performance he lowers his limbs, puts his proboscis down, pushes his little scissors out and make a neat cut deeper and deeper until he secures an outflow. You know what he is after and therefore need no explanation as to the character of what flows out.

Having completed his little artesian well, the mosquito proceeds to drink his fill, taking his supplies from the immediate surface and not through the employment of a pump as most persons suppose.

His meal being over he wipes his scissors nicely, puts them away in their case for use at next time of need, and quietly takes his leave. We say quietly, for, though the mosquito is a chronic singer, he never sings save when he is hungry.

And this, sonny, is all we know about "how a mosquito bites."

SUCCESS WITH CALADIUMS.

Following your advice in regard to planting the Caladium esculentum I now have as the result some very fine leaves, one (the largest so far), measuring 29x29 inches. X. X. X.

Jacksonville, Cherokee county, Tex.

Glad to hear of it. There are some very fine plants in Fort Worth this season, but, as is often the case, not a few of our citizens have made the mistake of planting on mounds. The Caladium does best on land not at all raised above the common level. In Atlanta, Ga., where more and finer Caladiums grow in the yards than in those of any other city, perhaps, one never sees a single specimen standing on land elevated above the common level.

IRRIGATION AND FRUITS.

In a recent article you stated that irrigation would enable the people of this section of Texas to grow almost everything grown in California, and with equal success, unless it should be something strictly sub-tropical. I cannot see how this could be, since irrigation would not change the climate. The "norther" would come all the same, and would, it seems to me, cut off tree fruits the same as now. TRINITY.

Tarrant County, Tex.

We still hold to the same position. It is not the norther or blizzard that damages our fruits, but the spring character of growth that the trees have taken upon themselves in midwinter, which renders them susceptible to the effects of sudden cold. A deciduous tree must have one period of rest in the course of the season, and as things now are it finds that period while our summer and fall drouths are on. Then the fall rains have set in this period of rest is broken and the trees rush into growth and become sappy, their fruit buds swelling, and so on. While in this condition it is entirely easy for a freeze to injure the fruit prospects. Now, under irrigation the trees would be kept growing through summer and fall with unbroken regularity, consequently they would be forced to find their period of rest as a result of lowering temperature in winter. Having had all the water needed through summer, there would be for them no stimulus to renewed growth when the fall rains put in an appearance. As a consequence they would sleep through winter, as it were, and awake into activity only with the rising temperature of spring, having their fruit buds entirely uninjured.

We have been noticing on Mr. Mayfield's place, corner of Belknap and Pecan streets, Fort Worth, a fair illustration of how irrigation would extend the period of fruiting with some fruit trees, at least. As stated by us on a former occasion, Mr. Mayfield makes a liberal and intelligent use of water on his grounds. Standing along his fence is a row of mulberry trees, which, at the time of this writing, (July 16), are still carrying a considerable crop of fruit. In many other yards of the city are mulberry trees of the same variety which bore well early in the season, but not a berry has been seen on one of them for at least two months past. Mr. Mayfield's trees have been yielding fruit regularly since ripening the first crop simultaneously with the other trees early in the season.

HOG CHOLERA—POTATO BUGS.

I am well pleased with the agricultural department of THE GAZETTE, but must be permitted to say you are wrong in your statement that hog cholera and the potato bug are unknown in Texas, for we have had both in this section. ****

Jacksonville, Cherokee county, Tex.

Our corresdondent must have misunderstood us, for we never intended to take any such position with reference to hog cholera. We may have asserted that there is much less of it here than in the so-called hog states at the North, which is entirely correct.

As to potato bugs, that depends upon the kind of bugs meant. There are in Texas no Colorado potato beetles (Doryphora 10-lineata), so far as we have yet been able to learn. Mr. Riley takes the grounds that it can never come here for the reason that our warm climate is against it. If anyone thinks he has Colorado potato beetles on his place he would confer a favor upon us, and possibly on others, by sending a few specimens to our address.

We don't pretend to say there are no potato beetles here. The blister beetles, (Lytta, in several species), are here the same as they are in all parts of North America, and they feed upon the foliage of the Irish potato, but they seldom appear in numbers sufficiently great to amount to much. They are something entirely different from the notorious Colorado beetle, however. In general appearance they somewhat resemble the common "lightning bug," while the Colorado beetle is a short, thick insect about half an inch in length and more than one-fourth of an inch in width across the back. It is of cream color marked with black stripes running lengthwise of the wing covers.

Persons who have seen the Colorado potato beetle but have never made a close study of it, might be easily deceived by its near relative, entomologically, known for common as the "mock Colorado potato beetle." Its scientific name is Doryphora juncta, and its general appearance is much the same as that of the other species, though the entomologist finds variations that enable him to readily distinguish the two apart.

This mock potato beetle is an insect of wide range, though it appears in numbers sufficiently large to really entitle it to classification as an injurious insect. Its favorite food-plant appears to be the horse nettle (Solanum carolinense), though it is occasionally found feeding upon the Irish potato. This may be the insect that our correspondent has in mind.

POPULAR SCIENCE.

SOME TIMELY NOTES ON AGUE AND FEVER.

Cause of the Disease—The Germ Theory. Where to Sleep—An Unsafe Home. The Best Remedy—How to Treat Ague and Fever.

In regions of country where ague and fever prevails, says a popular physician, it is, unfortunately, too well understood to call for any consumption of time in giving symptoms. There are supposed to be three forms of the malady, usually known popularly as "every-day-ague," "every-other-day-ague" "third-day-ague." All of these forms arise from the same cause and yield to about the same treatment. The form visiting the patient regularly on only one of three days is supposed to be the hardest form yet to get rid of. It is always best to apply to a physician for treatment, but occasionally from isolation or some other cause, persons are unable to do this, and for such as these the notes before you are specially written.

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A great diversity of opinion exists among medical men touching the direct cause of ague and fever, (we employ the popular name), some attributing it to one condition and some to another. A few years back it was pretty generally considered due to decomposing vegetable matter, but more recent developments have shaken that theory, and now there are many scientific men who hold that vegetable matter cuts no particular figure in the case; that the only condition necessary for a development of the disease is a high temperature acting upon a soil which has been saturated with moisture and is still wet, or at least, still damp. It is a miasmatic effect arising from foul or stagnated water—a high temperature causing it to rise and float to a position which enables it to reach the lungs. In a word, want of proper drainage in a region of country not favoring the immediate escape of all surplus water, renders the people who live there liable to be troubled by ague and fever. Any condition that leads to stagnation of water is favorable for a development of this disease.

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There is a late school of scientists who hold that all "miasmatic diseases" are strictly germ diseases. Some of them have pretended to describe the microbes acting in each particular form of miasmatic sickness. They may be entirely correct and in order, but it is not our present aim to go so deep into the science of the thing as to spend time over new theories. The authority upon whom we are drawing at present is a scientific physician of the old school well known in Fort Worth, and we shall not go beyond the lines he has laid down for us to follow.

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It is well understood that persons are most liable to contract ague and fever while sleeping, hence the importance of being careful with reference to where we sleep. The nearer we are to the ground, especially if the ground be wet or damp, the worse it is for us. Our residences should occupy high sites, and we should, during the so-called sickly season, sleep in an upper story if possible. A single-story house is much better for being set well up on piers, and so arranged that the atmosphere can freely roll through beneath the floor.

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But even homes on high and dry ground are not always exempt from malarial effects. The atmosphere rolls over the surface of the earth precisely as water does, seeking the depressions and natural passes; hence a house on elevated lands, but at the head of a valley which opens out into a malarious region, may be occupying as bad and possibly worse site than it would did it set directly at the mouth of the valley.

Surely the reader understands this clearly. Suppose the valley runs north and south with its head, where the house stands, to the north. A gentle wind comes rolling up from the south, moving the foul air and gases of the miasmatic region into the mouth of the valley and forcing it upward. Being heavier than common air they remain in the valley and are thus moved up to and into the house.

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Say what you may about it, quinine is the best known remedy for ague and fever, and particularly for employment in domestic practice. People object to taking it on account of its extremely bitter taste, but modern science has of late arranged a way by which they may dodge that bitter taste if they desire to do so. At any drug store you may buy your quinine all dosed out and put up in capsules, which may be swallowed without imparting any taste whatever.

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If capsules cannot be had containing quinine to be taken for ague and fever, a good plan is to make your quinine into pills with gentian, say 24 grains sulphate of quinine and extract of gentian enough to form into pills. Make 12 pills and give one every three hours, commencing immediately at the close of the sweating stage. If the chill returns the pills must be discontinued until the sweating stage has again passed, when they must be given again as before. This is for "every-day ague"—for the forms that do not return so often begin giving the pills 12 hours before the time of return. Next day follow with an active cathartic, and continue giving the quinine pills or capsules further and further apart for several days to prevent a return of the chill.

Panhandle of Texas.

For information in regard to the best wheat and small stock farming county of North west Texas write to F. A. Blanchard, Plainview, Hale county, Tex.

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